Environmental Work Group: Action Item #79
SP-F21 Predation: Supporting Information Report

Per the request made at the February 19th, 2003 EWG meeting, please find enclosed a list of information that will be generated from the various study plans that will contribute to the understanding of predation on juvenile salmonids in the Feather River.

SP-F21 "Project Effects on Predation of Feather River Juvenile Anadromous Salmonids" Task and Deliverables Expectations Review:

Task 1 - Describe the life history and habitat requirements of predator and prey species of primary management concern:

Information regarding the life stage characteristics and habitat requirements of Sacramento pikeminnow, striped bass, largemouth bass, Chinook salmon and steelhead were delivered in draft form to the EWG in December 2002. Predation related characteristics documented in the "fish matrix" include: adult size ranges, food base, adult feeding habits, adult migration timing range, peak adult migration timing, adult migration water temperature tolerance, adult migration water temperature preference, adult water temperature tolerance for holding, adult water temperature preference, water velocity range for holding adults, water velocity preference for holding adults, timing range for adult holding, timing peak for adult holding, timing range for emergence, timing peak for emergence, juvenile rearing habitat and strategies, water temperature tolerance for juvenile rearing, water temperature preference for juvenile rearing, water velocity ranges for juvenile rearing, water velocities preferred by rearing juveniles, water depth range for rearing juveniles, water depth preferences for rearing juveniles, cover preferences for rearing juveniles, predation of juveniles, timing range for rearing juveniles, timing peak for juvenile rearing, juvenile emigration water temperature tolerances, juvenile emigration temperature preferences, juvenile emigration juvenile emigration timing range, juvenile emigration timing peak, size range of emigrating juveniles, factors contributing to mortality, consumption rates by size, consumption rates by lifestage, consumption rates by water temperature, growth rate, predator interactions, prey interactions, competitor interactions, predator diet by size, predator diet by age group, association of predators to physical facilities including habitat conditions created by operations, association of predators to physical facilities including instream flow obstructions/diversions, association of predators to physical facilities.

Comparison of these characteristics between predator and prey species can identify temporal and environmental factors that will affect predation and provides the basis for analysis of the distribution of environmental variables, e.g. predator and prey species water temperature tolerances as compared to Feather River water temperature spatial and temporal distribution. The predation characteristics documented in the fish matrix also provide the criteria for modeling potential predation management Resource Actions, e.g. Could the operations alter the water temperatures in the low flow channel to potentially exclude the Sacramento pikeminnow and what effect would alterations in water temperature have on other Feather River fish species?

Task 2 – Summarize existing data describing the distribution of predator and prey species pf primary management concern in the Feather River

This set of predator and prey species spatial and temporal distribution was also provided to the EWG in December 2002, with the final report due in December 2003. The maps were a synthesis of the existing information on the distribution and relative abundance of predator and prey species. These maps are currently generalizations, but as specific predation questions are developed in the course of Resource Action development, the source data for the maps can be queried more specifically to support the understanding of predation. An example of this would be an analysis of the distribution of a water temperature for which predators exhibited a specific tolerance as compared to the relative frequency of observations of predator distribution.

Task 3 – Summarize existing literature investigating predation of juvenile anadromous salmonids associated with artificial structures and project operations in other river basins and determine their applicability to the Feather River

The report will document predator study and monitoring methods and evaluate their applicability to the Oroville conditions for: predator species composition and characteristics, similarity of habitat, similarity of artificial structures and hydraulics associated with artificial structures, similarity of operational patterns and seasonal flow fluctuations, water temperatures and resulting habitat alterations and similarity of ecosystem structure. This report will include the summarization of predation management measures designed to reduce predation related to facilities or operations. The report is due December of 2003.

Task 4 – Summarize and report PM&E measures from the literature review that are designed to reduce predation occurring at artificial structures or resulting from hydropower operations and perform a reconnaissance level evaluation of their potential applicability to the Oroville Facilities operations

The interim report was also provided to the EWG in December 2002, and the final report is due in December 2003. The interim report provided a review of different types of predation management PM&E's and their applicability to conditions of the Oroville facilities. The EWG was requested to recommend: additional studies to be reviewed, additional types of predation management to be investigated and a recommendation for further development of those types of predation PM&E's that warranted further development and characterization for the final report.

Supporting Information for Predation from Other Fisheries Study Plans:

SP-F3.2 –fish habitat distribution (mesohabitat, water temperature, cover, substrate)

SP-F10 - additional RST results of juvenile salmonid enumeration, additional snorkel survey's of juvenile salmonid distribution and relative abundance (including predator species)

SP-F16 – IFIM model results describing water depth and velocities at various flows, fish preference curves – Could be used to refine habitat distribution information for juvenile salmonids and evaluate potential predator velocity exclusions

Supporting Information for Predation from Other Discipline Study Plans

SP-W6 – water temperature sensor data from the Feather River

SP-G2 – mesohabitat with instream cover type, stage discharge relationships and water velocities at various flows at representative transects

SP-E2 – modeled water temperatures and flows